Planning of a FC720 Cerberus station (one fire panel or terminal)

Purpose:
With the project planning of the fire panel the load of the fire panel and the necessary batteries are verified. This results in the definite:
- type of station (fire panel / -terminal)
- type of batteries and power supply

Procedure:
1) Define type of station, dependent of # of detectors and PMI requirements
2) Fill out all additional sheets
3) Enter other loads from outputs and options
4) Enter required standby- and alarm time
5) Push "Calculation Button" for updating values
   --> If the panel configuration is not valid "Red/Orange Calculation Button" check
   … power supply and batteries, change with button if possible (depends on used station, power supply, …)
   … that all panel status information is ok
   --> With column "Try other settings" it's possible to check if actual config is possible with other housing
   … result has no impact to general configuration
   --> The panel configuration must be valid "Green Calculation Button" before continuing

Please consider:
It is not possible to check all interactions of all options with each other. Restrictions in the use of options together are noted in the document A6V10210362 "Planning" and A6V10210390 "Installation".

yellow fields	**Must** be filled in by the user
orange fields	Shows an **input data error**. These fields **must** be filled in by the user
green fields	Calculated value, **configuration valid**. Field must not be changed by the user.
red fields	Calculated value, **configuration invalid**. Field must not be changed by the user.
light green fields	Calculated value, **additional information** for the user. Field must not be changed by the user.

Panel selection

Configuration OK

Panel selection	FC722
	FC722-ZA (P)

Panel characteristics:

Panel type:	FC722-ZA (P)	
Variant:	International	
Order number:	S54433-C113-A3	
PMI type:	FCM2027	
Peripheral board:	FCI2023	
Housing type:	comfort	
Supply type:	SV 24V-150W-A5	150 W
Max. fitting batteries:	FA2006-A1	26 Ah
Max. fitting supply:	2xSV 24V-150W-A5	300 W

Add / Remove Extinguishing Sectors	Add extinguishing sectors	Remove extinguishing sectors

Field devices

C-NET Module2		quiescent current	alarm current	remarks
Current consumption (at panel by 24V)		0,094 A	0,160 A	Values from "C-NET_Module2"

Outputs of peripheral board

Sounder Lines			alarm current	remarks
Sounder line 1 (SOUND1)			0,000 A	

Alarm & Fault Outputs		quiescent current	alarm current	remarks
Load on "Output Alarm supervised" (AL_OUT)			0,000 A	
Load on "Output Fault supervised" (FAU_OUT)		0,010 A	0,000 A	

External supply output 1 (VSYS_01)		quiescent current	alarm current	remarks
External supply output 1 (VSYS_01)		0,000 A	0,000 A	Enter either all external loads at VSYS_01 pin in top row or single values below (ext. supply, activated IO outputs, ...). Enter average values.
Load on "Configurable I/Os" (I/Ox)		0,000 A	0,000 A	
Load for connected Sounder Modules	FCA2005-A1	0,000 A	0,740 A	
Load for connected FDCIO223	FDCIO223	0,000 A	0,000 A	
Load for connected FT724 Terminals	FT724	0,000 A	0,000 A	
Load for Scalance Ethernet Switch	X204-2 / S612	0,000 A	0,000 A	

External supply output 2 (VSYS_02)		quiescent current	alarm current	remarks
External supply output 2 (VSYS_02)		0,000 A	0,000 A	Enter either all external loads at VSYS_02 pin in top row or single values below (ext. supply, activated IO outputs, ...). Enter average values.
Load on "Configurable I/Os" (I/Ox)		0,000 A	0,000 A	
Load for connected Sounder Modules	FCA2005-A1	0,000 A	0,000 A	
Load for connected FDCIO223	FDCIO223	0,000 A	0,000 A	
Load for connected FT724 Terminals	FT724	0,000 A	0,000 A	
Load for Scalance Ethernet Switch	X204-2 / S612	0,000 A	0,000 A	

Operation add-on

Fire department periphery module		Quantity	quiescent power	alarm power	remarks
Fire department periphery module	FCI2001-D1	0 pcs			
FBF					
UeE					
FSD					
Kennleuchte					
FSE					
FAT					
OeA					

Operation add-on		Quantity	quiescent power	alarm power	remarks
Operation add-on with 2x24 LED indicators	FCM7213-Y3	0 pcs	0,00 W	0,00 W	Every 24-LED block not included in standard panel variant
Operation add-on with 4x24 LED indicators	FCM7214-Y3	0 pcs	0,00 W	0,00 W	Every 24-LED block not included in standard panel variant
Operating add-on with 20-zone EVAC indicator	FCM7221-H3	0 pcs	0,00 W	0,00 W	20-zone EVAC indicator add-on

Networking & Communication PMI

Networking		Quantity	quiescent power	alarm power	remarks
Ethernet connection		0 pcs	0,00 W	0,00 W	Only if used in operational mode of panel
Networking module (SAFEDLINK)	FN2001-A1	0 pcs	0,00 W	0,00 W	

Communication		Quantity		quiescent power		alarm power		remarks
RS232 module (isolated)	FCA2001-A1	1	pcs	0,26	W	0,26	W	
RS485 module (isolated)	FCA2002-A1	0	pcs	0,00	W	0,00	W	

Networking & Communication Add-on

Networking		Quantity		quiescent power		alarm power		remarks
Ethernet switch (MM)	FN2008-A1	0	pcs	0,00	W	0,00	W	
Security module (firewall)	FN2009-A1	0	pcs	0,00	W	0,00	W	
Fiber optic cable network module (SM/MM)	FN2006/7-A1	0	pcs	0,00	W	0,00	W	
Ethernet switch (modular) - SM/MM	FN2012-A1	0	pcs	0,00	W	0,00	W	
Repeater (SAFEDLINK)	FN2002	0	pcs	0,00	W	0,00	W	
Interface module	DL485/13-xx-ST-SBT	0	pcs	0,00	W	0,00	W	

Printer		Quantity		quiescent power		alarm power		remarks
Event printer	FTO2001-A1	1	pcs	0,050	A	0,060	A	If used: current= 50…100mA, depending on printing frequency. 1 RS232 Module required additionally

Detached-Options (supply from FS20 station)		Quantity		quiescent power		alarm power		remarks
Remote EVAC 20-zone	FCM2008-N1, 2xFTI2002-N1	0	pcs	0,00	W	0,00	W	One RS485 Module required additionally
Mimic display driver EVAC 10-zone	FT2003-N1	0	pcs	0,00	W	0,00	W	One RS485 Module required additionally

Panel

Own panel consumption	quiescent power		alarm power		remarks
Panel	2,64	W	4,32	W	

Supply 1 - Power consumption & Supply check & Battery check

Power calculation			quiescent power		alarm power		remarks
Panel			2,64	W	4,32	W	
Field devices			2,26	W	3,84	W	
Outputs peripheral board			0,24	W	17,76	W	
Operation Add-on			0,00	W	0,00	W	
Networking & Communication PMI			0,26	W	0,26	W	
Networking & Communication Add-on			1,20	W	1,44	W	
Additional Power Consumer (Power at 24V)	0	pcs	0,000	A	0,000	A	e.g. ASD
Additional Power Consumer (Power at 24V)	0	pcs	0,000	A	0,000	A	e.g. FT2040, FT2080
Additional Power Consumer (Power at 24V)	0	pcs	0,000	A	0,000	A	e.g. addtional power consumer
Additional Power Consumer (Power at 24V)	0	pcs	0,000	A	0,000	A	e.g. addtional power consumer
Additional Power Consumer (Power at 24V)	0	pcs	0,000	A	0,000	A	e.g. addtional power consumer
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Additional Power Consumer (Power at 24V)	0	pcs	0,000	A	0,000	A	e.g. addtional power consumer
Additional Power Consumer (Power at 24V)	0	pcs	0,000	A	0,000	A	e.g. addtional power consumer
Total power consumption with chosen options			**6,61**	**W**	**27,63**	**W**	Powered by power supply or external supply

Battery required standby-time and capacity	
Required standby-time	72 h
Required alarm-time (after standby)	0,5 h
Required batteries	20,4 Ah

Supply and battery calculation	Chosen Panel	Try other settings
		Change Housing
Housing	comfort	comfort
Max. fitting power supply into housing	300,0 W	300,0 W
Max. fitting battery into housing	26,0 Ah	26,0 Ah
	Change PS	**Change PS**
Power supply type (does not change if not possible due to battery)	SV 24V-150W-A5	SV 24V-150W-A5
Max. possible load power supply (calculation with 24V, different to power supply labeling)	100,8 W	100,8 W
Required load from configuration	30,4 W	
Min. battery (depend on power supply and case)	17 Ah	17 Ah
Max. battery (depend on power supply and case)	26 Ah	26 Ah
	Choose battery	**Choose battery**
Chosen battery	26 Ah	26 Ah
Max. possible charge power supply (calculation with 24V, different to power supply labeling)	120,0 W	120,0 W
Required power charge configuration	30,1 W	30,1 W
Battery, Power supply and case configuration	**Power&Battery ok**	**Power&Battery ok**

If the "Choosen Panel" does not fit the configuration, it's possible to check with „Try other settings" other cases, supplies and batteries.

Panel status information

Panel status information	
Amount of C-NET field devices:	198 pcs
Amount of FT2001 (C-NET) devices:	0 pcs
Amount of FRT/FRD (C-NET) devices:	0 pcs
Module bus 1 devices (line and exting. cards):	0 pcs
Module bus 2 devices (line and exting. cards):	0 pcs
Periphery bus devices:	1 pcs

Configuration OK

Planning of C-NET detector lines (one line card or one module)

Purpose:

With the project planning of the detector line the load of the line card is verified. This results in the definite:
- number and type of devices per detector line
- number of required line cards
- number of loops and stubs
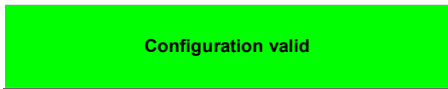- load of the panel in idle and alarm state

Procedure:

1.) Define the types and positions of the detector line devices in the building
2.) Define and choose the topology of the detector lines (loop or stub)
3.) Choose correct Alarm indicator extras (per loop/stub)
    --> ***None*** : At Alarm state Indicator flashing every 1s (10 Internal and 10 External AI's)
    --> ***Steady ON*** : At alarm state Indicator Steady ON (32 AI's)
    --> ***Operation Indicator*** : At Quiet state Indicator flashing every 1s (All AI's), at Alarm state Steady ON (10 AI's)
4.) Enter the number of devices per loop / stub in the table
    -> If Ex-devices are installed, enable Ex-line adaptor (max. 1 per stub / 2 per loop)
5.) Define the cable length according to the building plan
    -> Length for resistor- or capacity calculation must be calculated independent according to document A6V10210362
    -> Ex-Stub cable length needs not be entered (according to A6V10324618 and A6V10333771)
6.) Choose cable type or enter cable parameters manually
7.) Choose calculation characteristics
    --> ***Worst case*** : All devices are placed at end of line for calculation
    --> ***Equally*** : All devices are distributed equally over cable length. Possibility to add extra start and end cable length
8.) Add start and end cable length in case of equally calculation
9.) Check that no input field is orange
10.) All data are now complete, push ***"Calculation Button"*** to calculate the configuration.
    --> If all analysis field are clear and ***"Calculation Button"*** is green, configuration is valid
    --> If some analysis field are red and ***"Calculation Button"*** is red, change parameters to get a valid configuration

DifferenceWorstCaseEqually

Please consider:

If a control is connected to an external AI, this must be entered at Ext. AI-Control rows

yellow fields - **Must** be filled in by the user
orange fields - Shows an **input data error**. These fields **must** be filled in by the user
red fields - Calculated value, configuration not valid
clear fields - Calculated value, additional information for the user

Configuration valid

Input number of devices

Alarm indicator extras   None

Choose max. Line current   1,5

Add or remove loop extension

Device Population	C-NET (P) on FCI2023-A1			
	Loop	Loop	Loop	Loop
	Loop1	**Loop2**	**Loop3**	**Loop4**
Point detectors				
OP720 - Smoke detector	11 pcs.	2 pcs.	8 pcs.	0 pcs.
OH720 - Multi Sensor detector (ES<=14)	18 pcs.	17 pcs.	7 pcs.	0 pcs.
OH720 - Multi Sensor detector (ES>=15)	0 pcs.	0 pcs.	0 pcs.	0 pcs.
OOH740 - Multi Sensor detector (ES<=29)	57 pcs.	15 pcs.	7 pcs.	0 pcs.
OOH740 - Multi Sensor detector (ES>=30)	0 pcs.	0 pcs.	0 pcs.	0 pcs.
Special detectors				
Manual call points				
FDM22x - Manual call points	21 pcs.	3 pcs.	14 pcs.	0 pcs.
Line modules				
FDCI222 - Input module (4I)	1 pcs.	0 pcs.	0 pcs.	0 pcs.
FDCIO221 - In/Output module (1I&1O)	0 pcs.	1 pcs.	0 pcs.	0 pcs.
FDCIO222 - In/Output module (4I&4O)	3 pcs.	2 pcs.	2 pcs.	0 pcs.
Radio devices				
Integrated modules				
Alarm devices - Sound				
FDS224-R, FDS224-W - Sounder red or white housing, **Sound High**	0 pcs.	0 pcs.	9 pcs.	0 pcs.
Alarm devices - Sound and Voice				
Alarm devices - Sound and Light (Beacon)				
Alarm devices - Sound and Voice and Light (Beacon)				
External AI-Control				
DJ119x, FDAI9x - Ext. AI-Control	0 pcs.	0 pcs.	0 pcs.	0 pcs.
DJ119x , FDAI9x - Ext. AI-Control Inverse	0 pcs.	0 pcs.	0 pcs.	0 pcs.
SPF5100 - Control module	0 pcs.	0 pcs.	0 pcs.	0 pcs.
SPF5100 - Control module Inverse	0 pcs.	0 pcs.	0 pcs.	0 pcs.
Operation and indication devices				
Intrinsically safe stub lines 1 (Ex) - *Line capacitance max. 82nF, line inductance max. 2.3mH, line resistance max. 50 Ohm*				
Intrinsically safe stub lines 2 (Ex) - *Line capacitance max. 82nF, line inductance max. 2.3mH, line resistance max. 50 Ohm*				

Input cable characteristics

Cable characteristics	Not shielded, cable 2x0.8 ř	**C-NET (P) on FCI2023-A1**

	Loop1	Loop2	Loop3	Loop4
Cable length for line resistor	1 m	1 m	1 m	1 m
Cable length for line capacity	1 m	1 m	1 m	1 m
Resistance value R' of cable	70 Ohm/km	70 Ohm/km	70 Ohm/km	70 Ohm/km
Capacitance value Cs' of cable	70 nF/km	70 nF/km	70 nF/km	70 nF/km

Calculation characteristics	C-NET (P) on FCI2023-A1			
	Worst case	Worst case	Worst case	Worst case
	Loop1	Loop2	Loop3	Loop4
Cable length at start to first device	1 m	1 m	1 m	1 m
Cable length at end to last device	0 m	0 m	0 m	0 m
Average distance between devices	0,0 m	0,0 m	0,0 m	0,0 m

- Length for line resistor & definition R' see document A6V10210362
- Length for line capacity & definition Cs' see document A6V10210362
- Ex line lengths need not be added here (according to A6V10324618 and to FDCL221-Ex specification A6V10333771)

Analysis of configuration

Device information	C-NET (P) on FCI2023-A1			
	Loop1	Loop2	Loop3	Loop4
Adressindex (AK) per Loop / Stub	111	40	47	0
Total Adressindex (AK) per Line Card	198			

Alarm calculation	C-NET (P) on FCI2023-A1			
	Loop1	Loop2	Loop3	Loop4
Maximum alarm current per Loop / Stub	1,5 A	1,5 A	1,5 A	1,5 A
Alarm current per Loop / Stub	0,053 A	0,028 A	0,072 A	0,000 A
Maximum alarm current per Line Card	1,5			
Total alarm current per Line Card	0,153 A			
Current consumption alarm (at Panel by 24V)	0,160 A			

Quiet calculation	C-NET (P) on FCI2023-A1			
	Loop1	Loop2	Loop3	Loop4
Quiet current per Loop / Stub	0,039 A	0,015 A	0,017 A	0,000 A
Total quiet current per Line Card	0,071 A			
Current consumption quiet (at Panel by 24V)	0,094 A			

Cabling information	C-NET (P) on FCI2023-A1			
	Loop1	Loop2	Loop3	Loop4
Resistor load per Loop / Stub	0,1 Ohm	0,1 Ohm	0,1 Ohm	0,1 Ohm
Additional possible resistor load per Loop / Stub (approximate estimate, dRmax)	213,4 Ohm	239,9 Ohm	158,5 Ohm	0,0 Ohm
Additional possible cable length per Loop / Stub (approximate estimate)	3049 m	3299 m	2264 m	0 m
Maximum line capacitive per Loop / Stub	750 nF	750 nF	750 nF	750 nF
Cable capacitive per Loop / Stub	0,07 nF	0,07 nF	0,07 nF	0,07 nF
Capacitive extra load of devices per Loop / Stub	0 nF	0 nF	0 nF	0 nF
Maximum line capacitive per Line Card	1 000 nF			
Total capacitive load per Line Card	0 nF			

Configuration valid